



# Southern Forest Health Research and Management Update



Fall 2015

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**This newsletter is a  
joint publication of:**

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## Science and Program Highlights

### **SRS, FHP, and LSU Collaborate on Establishing EAB Biocontrol Program in Louisiana**

Following detection of the emerald ash borer (EAB) in southern Arkansas in 2014, Forest Health Protection (FHP) personnel conducted ground surveys and discovered EAB infestations in northern Louisiana in early 2015. A cooperative effort between LSU Asst. Professor and IPM entomologist Rodrigo Diaz and Pineville Southern Research Station and FHP personnel is currently underway to establish an EAB biocontrol program in the region. Fantastic, expedient cooperation with the APHIS EAB Biocontrol Program has resulted in the releases of the egg parasitoid *Oobius agrili* and larval parasitoids *Tetrastichus planipennisi* and *Spathius agrili* in northern Louisiana. As of this month, approximately 27,000 total parasitoids have been released at two EAB infestations.



*Dr. Rodrigo Diaz inspects an *Oobius agrili* release device installed on an emerald ash borer-infested ash tree in north Louisiana, May 2015.*

Dr. Diaz has been awarded funding to evaluate the progress of these biocontrol efforts and the natural factors affecting EAB populations in what is currently the southern-most known infestation in North America. Coupled with the FHP-funded efforts of Dr. Mohammad Bataineh, Asst. Professor of Forest Health at University of Arkansas-Monticello in evaluating EAB life history in Arkansas, the products of these efforts should result in a solid contribution to the understanding of EAB behavior in the western Gulf region. For more information, please contact Wood Johnson, Forest Health Protection ([woodjohnson@fs.fed.us](mailto:woodjohnson@fs.fed.us)).

## Yellow-Poplar Weevil Damage in the Southern Appalachian Region of North Carolina and Tennessee

The yellow-poplar weevil (*Odontus calceatus* Say) was noted to cause significant leaf tissue damage to its primary host, yellow-poplar (*Liriodendron tulipifera* L.), in western North Carolina and eastern Tennessee during June and July of 2015. This native insect is generally considered a minor pest with occasional local infestations noticed throughout the native range of yellow-poplar. For reasons not entirely certain, the populations of the weevil reached outbreak levels impacting 23 counties in 2015 as reported from an ocular road survey conducted by USDA Forest Health Protection. Similar outbreaks were also reported in West Virginia, Virginia, and Pennsylvania, primarily in the Appalachian Mountain region. The last time similar reports of infestations reaching these proportions were in 1960, 1962, 1965, 1967, 1968 and 1971 when insect populations increased to significantly damaging levels.

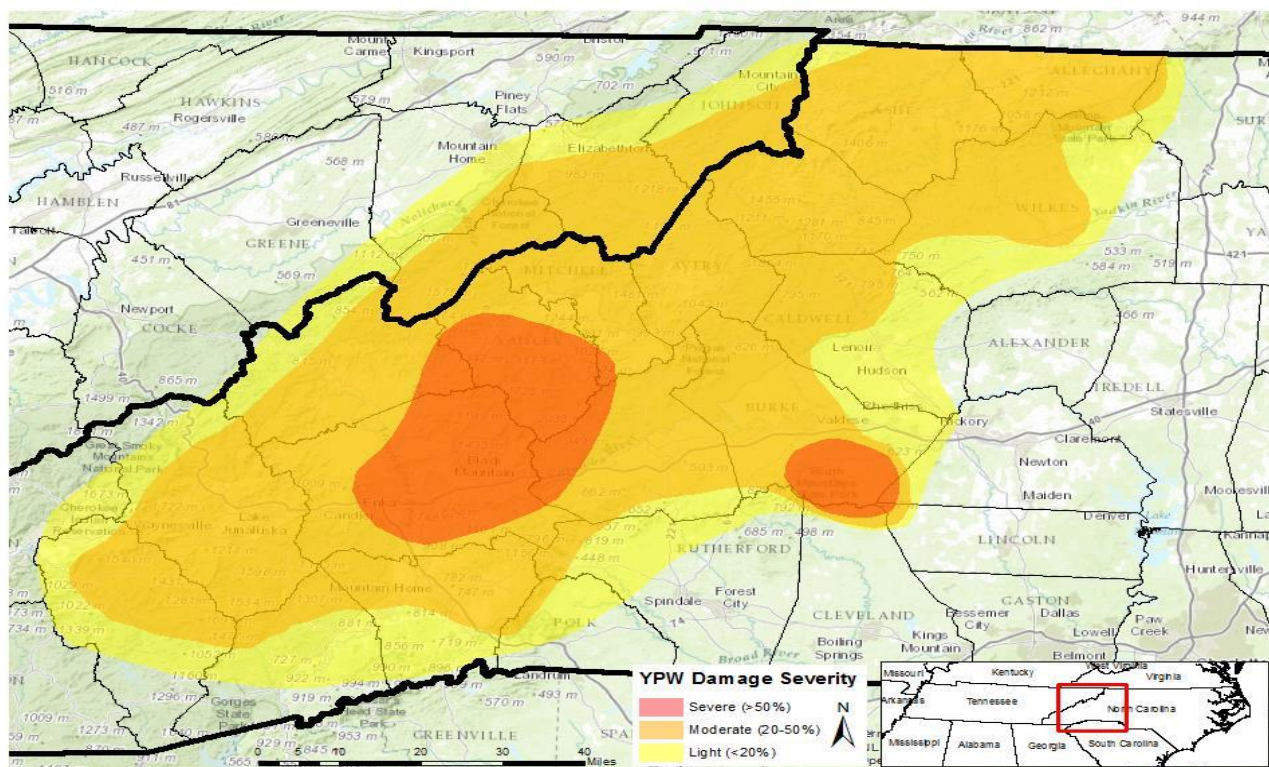


Figure 1. Survey map depicting Yellow-poplar weevil damage severity in western North Carolina and eastern Tennessee in June and July 2015 as determined by ground observations. Damage severity (%) reflects ocular estimates of average total leaf area loss for individual trees.

For more information, contact Paul Merten ([pmerten@fs.fed.us](mailto:pmerten@fs.fed.us)) or Ryan Blaedow ([ryanblaedow@fs.fed.us](mailto:ryanblaedow@fs.fed.us)).



## Insects promote wood decomposition and nutrient cycling in forests.

Although insects are often overlooked in studies of wood decomposition, two recent review articles written by SRS 4552 entomologist Michael Ulyshen suggest these organisms may act to speed up the process, promote nitrogen cycling and have the potential to benefit forest productivity. In the first article, published in *Biological Reviews* (DOI: 10.1111/brv.12158) insects are shown to have variable direct and indirect effects on wood decomposition, with a net collective effect of ~10-20%.



*A pile of wood fragments created by a tunneling passalid beetle.*

In the second article, published in *Ecological Entomology* (DOI: 10.1111/een.12176), several mechanisms by which insects are likely to influence nitrogen dynamics within decomposing wood are discussed. These include accelerating the release of nitrogen and promoting nitrogen fixation. Because nitrogen is the limiting nutrient in many forests, these effects have the potential to benefit forest productivity. Both articles underscore the benefits to be had from protecting dead wood and insects associated with it in managed forests. Research aimed at specifically exploring the connection between wood-feeding insects and forest productivity is underway. For more information, contact Dr. Michael Ulyshen ([mulyshen@fs.fed.us](mailto:mulyshen@fs.fed.us)).

## Boy Scout Troop 91 Volunteer on Summer Projects

On August 3, 2015, members and friends of local Boy Scout Troop 91 helped SRS employees Bud Mayfield, Bryan Mudder, Julia Kirschman, and UNCA intern Ivy Haas plant hemlock trees at the Bent Creek Experimental Forest near Asheville, NC.



The trees were planted as an “insectary” where predators of the invasive Hemlock Woolly Adelgid will be reared.

In a related project, sixth grade scout William David also worked with Dr. Mayfield to survey for the invasive Walnut Twig Beetle in one of Asheville’s urban greenways. Many thanks to these Scouts for helping to mitigate the impact of invasive species!

*Picture, left: Members and friends of Asheville Boy Scout Troop 91 after a day of planting hemlocks.*

## In the News

### Forest Fun Day at Sandy Creek Nature Center in Athens, GA



Mary Williams participated in Forest Fun Day on September 26, 2015 at Sandy Creek Nature Center. The Fun Day had future Foresters creating small animal habitats and identifying plants found in the forest.

The purpose of the event was to help build support for a Managed Forest Project that includes Forest Ecology, Community Natural Resource Stewardship, Land Ethics and Sustainable Forestry.

*Future forester in the woods!*

### BugFest, Raleigh, NC

On September 19, 2015, almost 32,000 kids and adults gathered at the North Carolina Museum of Natural Sciences in Raleigh to celebrate BugFest. The free event featured over 100 bug-related exhibits, crafts, games, and activities, and a number of presentations.



The Southern Research Station's (SRS) booth "Buggy About Pollinators" was a big hit with the kids, and Stacy Blomquist, biological science technician at the Insects, Diseases and Invasive Plants unit gave a presentation called "What's All the Buzz about Pollinators?"

Native bees were the primary focus of Blomquist's talk. "There are 4,000 native bee species in the United States," says Blomquist. "A lot of the children didn't know there were any bees other than honeybees." Stacy also discussed the life cycles and biology of bees as well as their food and habitat requirements. Many native bee species live in existing holes in wood or in hollow plant stems, and Blomquist showed participants how they could build native bee houses. "Not everyone can keep honeybees," says Blomquist. "However, most people can have a native bee house." (Excerpted from article by Sarah Farmer, SRS Science Delivery)

*Stacy shows pollinators to a BugFest participant.*

## Staff Changes



**Dr. Jaesoon Hwang** is the new Plant Pathologist with Forest Health Protection in Pineville, LA. He obtained a BS in Agricultural Biology, a MS in Plant Pathology both from Korea University in Seoul, Korea, and a PhD in Plant Pathology from North Carolina State University. As a Research Scientist at Clemson University, he worked on Sudden Oak Death cooperating with Forest Service and APHIS before joining FHP. His graduate and post graduate studies include detection, identification, biological control, and resistance screening of soil-borne diseases.



**Derek Robertson** is a new Biological Science Technician with SRS 4552 in Athens, GA. Derek's prior work experience includes the Marines (electronics repairman and air traffic controller), University of Florida (termite and agricultural research), retail, and other diverse jobs. He received his BS from Gainesville State College in Environmental Science and MS from the University of Georgia in Forest Entomology. Currently he works with Dr. Rima Lucardi on forest ecology and invasive species projects. Welcome Derek!

## Technology Transfer

### **Publications (in print/press):**

1. Arsenault, A.L., A. E. Mayfield, and K.F. Wallin (in press). **Ambulatory responses of *Laricobius nigrinus* (Coleoptera: Derodontidae), a hemlock woolly adelgid predator, to odors from prey, host foliage, and feeding conspecifics.** Journal of the Entomological Society of British Columbia.
2. Cameron, R. S., J.L. Hanula, S.W. Fraedrich, and C. Bates. 2015. **Progression and Impact of Laurel Wilt Disease within Redbay and Sassafras Populations in Southeast Georgia.** Southeastern Naturalist (Accepted, in press).
3. Fraedrich, S. W., T. C Harrington and G. S. Best. 2015. ***Xyleborus glabratus* attacks and systemic infections by *Raffaelea lauricola* associated with dieback of camphortree (*Cinnamomum camphora*) in the southeastern United States.** Forest Pathology 45:60-70.
4. Chen, Y., Ulyshen, M.D., Poland, T. in press. **Abundance of volatile organic compounds in ash phloem and emerald ash borer larval frass does not attract *Tetrastichus planipennisi* in Y-tube olfactometer.** Insect Science.
5. Cram, M. M. and S. W. Fraedrich. 2015. **Evaluations of inoculations with arbuscular mycorrhizal fungi on eastern redcedar.** Tree Planter's Notes (In Press)
6. Duan, J.J.; Bauer, L.S.; Abell, K.J.; Ulyshen, M.D.; Van Driesche, R. in press. **Population dynamics of an invasive forest pest and its associated natural enemies in the aftermath of invasion: Potential for success in biological control of emerald ash borer.** Journal of Applied Ecology.



7. Fraedrich, S. W., C. W. Johnson, R. D. Menard, T. C. Harrington, R. Olatinwo and G. S. Best. 2015. **The First Report of *Xyleborus glabratus* (Coleoptera: Curculionidae: Scolytinae) and Laurel Wilt in Louisiana: The Disease Continues Westward on Sassafras.** Florida Entomology (Accepted, In press).
8. Mayers, C. G., D. L. McNew, T. C. Harrington, R. A. Roeper, S. W. Fraedrich, P. H.W. Biedermann, L. A. Castrillo, S. Reed. 2015. **Three lineages within the Ceratocystidaceae adapted to symbiosis with three ambrosia beetle tribes with large mycangia.** Fungal Biology (Accepted, In press).
9. Miller, D.R., C.M. Crowe, K.J. Dodds, L.D. Galligan, P. de Groot, E.R. Hoebeke, A.E. Mayfield III, T.M. Poland, K.F. Raffa and J. D. Sweeney. 2015. **Ipsenol, ipsdienol, ethanol and  $\alpha$ -pinene: Trap lure blend for Cerambycidae and Buprestidae (Coleoptera) in pine forests of eastern North America.** J. Econ. Entomol. 108: 1837-1851.
10. Müller, J.; Thorn, S; Baier, R.; Sagheb-Talebi, K; Barimani, H.V.; Seibold, S.; Ulyshen, M.D., Gossner, M.M. in press. **Protecting the forests while allowing removal of damaged trees may ecologically degrade the Hyrcanian beech forests of Iran.** Conservation Letters.
11. Niño-Domínguez, A., B. T. Sullivan, J. H. López-Urbina, and J. E. Macías-Sámano. 2015. **Pheromone-mediated mate location and discrimination by two syntopic sibling species of Dendroctonus bark beetles in Chiapas, Mexico.** Journal of Chemical Ecology: published in online edition.
12. Shepherd, W.P, B.T. Sullivan, A.E. Mayfield III, and R.C. McDonald (in press). **Olfactory responses of the hemlock wooly adelgid predator, *Laricobius nigrinus*, to natural and synthetic conifer volatiles.** J. Entomol. Sci.
13. Siebold, S.; Brandl, R.; Gossner, M.M.; Thorn, S.; Ulyshen, M.D.; Müller, J. in press. **Studying biodiversity in dead-wood experiments- A review to identify global knowledge gaps.** Biological Conservation.
14. Ulyshen, M.D. in press. **Wood decomposition as influenced by invertebrates.** Biological Reviews.
15. Zhu, H., H. W. Thistle, C. M. Ranger, H. Zhou and B. L. Strom. 2015. **Measurement of semiochemical release rates with a dedicated environmental control system.** Biosystems Engineering 129: 277-287.

### Submitted Publications (accepted/in review):

1. Audley, J., A. Taylor, W.E. Klingeman III, A.E. Mayfield III, S.W. Myers (in review). **Insecticide dip treatments to prevent walnut twig beetle colonization of black walnut logs.** Forest Products Journal.
2. Bookwalter J. D., J. J. Riggins , J. F.D. Dean , V. Mastro, L. R. Schimleck , B.T. Sullivan , K. Zylstra, and K. J.K. Gandhi . 2015 **Colonization and development of *Sirex noctilio* F. in bolts of seven species of pine (*Pinus* L.) of the southeastern United States.** Journal of Economic Entomology: to be revised and resubmitted.
3. Fraedrich, S. W., A. E. Mayfield, and J. L. Hanula and T. C. Harrington (in review). **The interactions of *Xyleborus glabratus* and *Raffaelea lauricola* with species in the family Lauraceae in the southeastern United States.** Proceedings of Workshop on *Xyleborus glabratus* and *Euwallacea* spp. Xalapa, Mexico. November 2 - 8, 2014.
4. Handoo, Z. A., L. K. Carta, A. M. Skantar, S. A. Subbotin, and S. W. Fraedrich. **Molecular characterization and redescription of *Xiphinema chambersi* Thorne, 1939 (Nematoda: Longidoridae) population from Live Oak trees in Jekyll Island, Georgia with comments on its morphometric variations.** Journal of Nematology (Submitted)
5. Hughes, M.A., J. A. Smith, R. C. Ploetz, P. E. Kendra, A. E. Mayfield, III, J. L. Hanula, J. Hulcr, L. L. Stelinski, S. Cameron, J. J. Riggins, D. Carrillo, R. Rabaglia, J. Eickwort, and T. Pernas (in review). **Recovery Plan for Laurel Wilt on Redbay and Other Forest Species Caused by *Raffaelea lauricola* and Disseminated by *Xyleborus glabratus*.** Plant Health Prog.
6. Shepherd, W. P, Sullivan, B.T., Mayfield III, A.E., and McDonald, R.C. 2015. **Responses of the hemlock wooly adelgid predator, *Laricobius nigrinus*, to natural and synthetic conifer volatiles,** Journal of Entomological Science, accepted for publication.
7. Seibold, S.; Bässler, C.; Brandl, R.; Büche, B.; Szallies, A.; Thorn, S.; Ulyshen, M.D.; Müller, J. in review. **Resource heterogeneity as major driver of biodiversity in dead wood.** Journal of Applied Ecology.
8. Stoklosa, A.M.; Ulyshen, M.D.; Fan, Z.; Varner, M.; Seibold, S.; Müller, J. in review. **Insects accelerate fine woody debris decomposition after assessing hidden treatment effects.** Basic and applied ecology

## Presentations and Lectures:

1. Best, G.S. and S.W. Fraedrich. 2015. **Systemic movement of Raffaelea lauricola through the rhizomes of pondberry.** American Phytopathological Society Annual Meeting, Pasadena, CA. 1-5 August 2015.
2. Best, G.S. and S.W. Fraedrich. 2015 **Laurel wilt in pondberry and camphor tree.** Laurel Wilt Conference, Florida. June 2015 (invited).
3. Castrillo, L., J. Vandenberg, M. Griggs, R. Camp, A. Taylor and A. Mayfield. 2015. **Initial report on the virulence of entomopathogenic fungi Beauveria bassiana and Metarhizium brunneum against Pityophthorus juglandis and impact on brood production.** Southern Forest Insect Work Conference, 22 July 2015, Fayetteville, AR (Poster).
4. Fraedrich, S.W., C.W. Johnson, R.D. Menard, G.S. Best, T.C. Harrington. **Laurel wilt in Louisiana: The disease continues to spread on sassafras (Sassafras albidum).** American Phytopathological Society Annual Meeting, Pasadena, CA. 1-5 August 2015.
5. Gandhi, K., B. Barnes, J. Bookwalter, D. Robertson, C. Asaro, J. Meeker, D. Miller, W. Johnson, J. Riggins, W. Shepherd and B. Sullivan. **Community, population, and chemical ecology of Sirex and their parasitoids in the Southeast.** South. For. Insect Work. Conf., Fayetteville LA. July 2015.
6. Hanula, J.L., S. Horn, M. Ulyshen and M. Callahan. 2015. **A growing problem: the impact of the invasive shrub, Chinese privet, on riparian forests.** In, Current and Potential Exotic Species and Their Impacts in the SE US, Part I. 57th Annual So. For. Insect Work Conf. July 21-24, 2015, Fayetteville, AR.
7. Hanula, J.L. and M. Ulyshen. 2015. **Do ground-dwelling insects need coarse woody debris and do saproxylic insects influence its decomposition?** In, Pests, Decomposition, and Nutrient Cycles in Forest Ecosystems. 57th Annual So. For. Insect Work Conf. July 21-24, 2015, Fayetteville, AR.
8. Lucardi, R.D., C. Bates, K.S. Burgess, and T.D Marsico. **What is this seed? Increasing the efficacy of invasive species interceptions at our nation's borders.** Joint Meeting of the 17th Annual SE-EPPC and NC-IPC. NC Botanical Gardens. May 2015. Chapel Hill, NC.
9. Lucardi, R.D., G.E. MacDonald, N.J. Loewenstein, and S.F. Enloe. **Genetics and herbicide: the Diverging Tale of Cogongrass in the Southeast.** Joint Meeting of the 17th Annual SE-EPPC and NC-IPC. NC Botanical Gardens. May 2015. Chapel Hill, NC.
10. Lucardi, R.D., C. Bates, K.S. Burgess, and T.D Marsico. **Technology development to increase the efficacy of invasive propagule interceptions in the face of increasing trade volume.** 13th International Conference Ecology and Management of Alien Plant Invasions (EMAPI) September 2015. Hawai'i Island, HI. (Poster).
11. Lucardi, R.D. and G.N. Ervin. **Not all invasives are created equal: Cogongrass (Imperata spp.) in the southern US and around the world.** Invited Paper. 13th International Conference Ecology and Management of Alien Plant Invasions (EMAPI) September 2015. Hawai'i Island, HI.
12. Lucardi, R.D. **Invasion ecology: propagule pressure and genetic diversity.** Invited Lecture-Invasion Ecology. University of Kentucky. September 2015. Lexington, KY.
13. Lucardi, R.D. **The Brave New World of Testing Invasion Theory in Real-Time. Invited Seminar.** Department of Entomology. University of Kentucky. September 2015. Lexington, KY.
14. Lucardi, R.D. **Federal Noxious Weed Survey at the Port of Savannah.** Invited Presenter, Pest Risk Committee Meeting-US Customs and Border Protection, Department of Homeland Security, Operations Center. August 2015. Savannah, GA.

15. Mayfield, A.E, III. 2015. **A Project Perspective: Identifying and Addressing Key Problems in the Southern U.S. Plenary Session II: Challenges and Opportunities for the Future of Insect, Disease and Invasive Plants R&D in the Forest Service.** Southern Forest Insect Work Conference, 22 July 2015, Fayetteville, AR.
16. Meeker, J. R., B. L. Strom, J. Bishir and J. H. Roberds. **The southern pine beetle in loblolly pine: simulating within-stand interactions using the process model SPBLOBTHIN.** 57th Annual Southern Forest Insect Work Conference, 21-24 July 2015, Fayetteville, AR (invited oral presentation, Meeker presented).
17. Miller, D.R. 2015. **The role of tree climbing in forest entomology.** At the Southeastern Tree Climbing Workshop and Reunion 2015, Charlie Elliott Wildlife Center, Mansfield GA. 12 September.
18. Olatinwo, R. **Weather Research and Forecasting Models—Mitigation of Thrips and TSWV Management Options. Enhancing Risk Index-Driven Decision Tools for Managing Insect Transmitted Plant Pathogens.** AFRI NIFA Sponsored Workshop, University of California, Asilomar Conference Grounds, Pacific Grove, CA, May 14-16, 2015 (Invited talk).
19. Olatinwo, Rabi, James Meeker, Wood Johnson, and Christopher Carlton. **Genetic variability among *Amylostereum areolatum* isolates from native *Sirex nigricornis* (Hymenoptera: Siricidae) in Central Louisiana.** The 57th Annual Southern Forest Insect Work Conference, July 21-24, 2015, Fayetteville, Arkansas. (Poster)
20. Sullivan, B. T. and A. Niño. 2015. **Strange behavior: The idiosyncratic biology of *Dendroctonus mesoamericanus*.** Oral presentation. Brian Sullivan and Alicia Niño. Southern Forest Insect Work Conference. 24 July 2015. Fayetteville, AK. (Invited oral presentation)
21. Sullivan, B.T., W. P. Shepherd, A. Grady, R. Hofstetter, and J. Allison. 2015. **Newly-identified pheromone blends and species associations for some forest insects of the US.** Southern Forest Insect Work Conference. 23 July, 2015. Fayetteville, AK. (Invited oral presentation).
22. Ulyshen, M.D. **Wood decomposition and nutrient cycling as influenced by insects.** Invited plenary lecture, 45 mins. [Royal Entomological Society annual meeting and International symposium, Trinity College Dublin, Ireland, September 2015].
23. Whitney, T.D., A.N. Schulz, C. Asaro, D.R. Coyle, M.M. Cram, A. Mech, R.D. Lucardi & K.J.K Gandhi. **Link between a scale insect and eastern white pine dieback: overview and future directions.** 57th Annual Meeting of the Southern Forest Insect Work Conference. July 2015. Fayetteville, AR.
24. Wuest, C.E., T.C. Harrington, D.L. McNew, S.W. Fraedrich. 2015. **Cryptic sex in the laurel wilt pathogen, *Raffaelea lauricola*, and sexual states in three of the closely related ambrosia beetle symbionts.** American Phytopathological Society Annual Meeting, Pasadena, CA. 1-5 August 2015.
25. Zafar, A. Handoo, Z.A. Lynn K. Carta, Andrea M. Skantar, Sergei A. Subbotin, Stephen W. Fraedrich, Michelle M. Cram. 2015. **Redescription and molecular characterization of *Xiphinema Chambersi* Thorne, 1939 (Nematoda: Longidoridae) from live oak trees in Jekyll Island, Georgia with comments on its morphometric variations.** Society of Nematology Meeting, July 2015.

## Other Tech Transfer:

1. April 14, 2015. Stacy Blomquist made a presentation at the Pineville Kiwanis Club, **“What’s Bugging You?”** (Pineville, LA).
2. April 19, 2015. Stacy Blomquist made a presentation to the Lutheran Women’s Missionary League of Redeemer Lutheran Church, **“Our Native Bees and How You Can Help”** (Alexandria, LA).
3. April 17, 2015. Rab Olatinwo and Brian Strom participated in a field tour for forest pathology students from the Louisiana State University **on operation forest pathology tour at the Johnson Tract**, Kisatchie National Forest, Elmer, LA.
4. May 2, 2015. Rab Olatinwo, Stacy Blomquist, JoAnne Barrett, and other RWU-4552 employees participated and organized the **8th Annual USDA Forest Service/Kent House Bug Day** at the Kent House Plantation, Alexandria, LA.



5. June 22-26, 2015. Rab Olatinwo and Brian Strom participated in field tour for kids at the Longleaf Vista, Kisatchie National Forest in Central Louisiana as part of the **Summer Science Blast, Week 3, Bug Week**.
6. Summer 2015. Bud Mayfield hosted Boy Scout Troop 91 of Asheville, NC to assist with **walnut twig beetle trapping survey and hemlock insectary planting**.
7. Summer 2015. Elementary Children learn Forest Biology at **Summer Science Blast**, a 4-week science education program enjoyed by 240 children from the Caddo Parish School Board Homeless Education Program. The Blast, coordinated by Sci-Port, the Science Center of Louisiana, and the USDA Forest Service, brought children (grades 3-6) into week-long modules focusing on wetland biology, forestry & entomology.
8. July 11, 2015. Stacy Blomquist and JoAnne Barrett hosted booth presentation: Insect Day at the Louisiana State Arboretum, **"Invasive Insect Pests of the Forests"** (Chicot, LA). ~ 400 participants
9. September 10, 2015. Stacy Blomquist made a presentation to the Olla Garden Club, **"What's All the Buzz About Pollinators?"** Olla, LA.
10. September 10-13, 2015. Dan Miller presented **"Role of tree climbing in forest research studies"** to 30 participants at the Southeast Tree Climbing Workshop and Reunion, Charlie Elliott Wildlife Center, Georgia Department of Natural Resources, Mansfield, GA.
11. September 19, 2015. **BugFest 2015**, Raleigh, NC. Stacy Blomquist attended and hosted a booth with over 31,000 visitors during the single day event. Visitors learned about pollinators (so many had never heard of native bees) and received a bag of wonderful items provided by our friends at the Natural Inquirer, and fun tokens from Smokey Bear.
12. September 26, 2015. Stacy Blomquist hosted booth presentation at National Hunting and Fishing Day, **"Beware! Emerald Ash Borer"**, Woodworth, LA - 3,816 participants.

USDA Forest Service  
Forest Health Protection, Southern Region:  
<http://www.fs.usda.gov/main/r8/forest-grasslandhealth>

Southern Research Station  
RWU 4552: Insects, Diseases and Invasive Plants of Southern Forests:  
<http://www.srs.fs.usda.gov/idip/index.html>

